

REMARKS

I. Claim Changes

Only the more limited substrate claims 21 to 22, which limit the base layer to a ceramic or glass ceramic base layer, have been retained. Claims 1 to 20 have been canceled.

New claims 23 to 45 include dependent substrate claims 23 to 27, which dependent on independent substrate claim 22. New dependent substrate claims 23 to 26 include subject matter from canceled dependent claims 5 to 8 respectively. However new dependent substrate claim 25 includes additional subject matter regarding the preferred embodiment involving TiO₂ dopant from page 10, lines 1 to 5, of applicants' specification. New dependent substrate claim 26 includes additional subject matter from the last paragraph on page 8 of applicants' specification. New dependent substrate claim 27 is a new product-by-process claim that states that the covering layer is made by a chemical vapor deposition process, a sputtering process with or without ion bombardment or a sol-gel process, which is based on the disclosure in the second paragraph on page 11 of applicants' specification.

New process claims 28 to 34 claim a process for making the substrate of claims 22 to 27. Process claim 28 includes the features of claim 22 and canceled claim 9. Dependent process claims 29 and 32 claim preferred processes for

applying the covering layer to the base layer and is also based on the second paragraph on page 11 of applicants' specification. Dependent process claim 31 includes subject matter from canceled claim 8 and the specification, like substrate claim 26. Dependent process claims 30 and 34 include subject matter from canceled claims 6 and 7. Dependent process claim 33 is essentially canceled claim 11.

Element claim 35 is the similar to canceled element claim 13, but includes all the features and limitations of claim 22. Dependent element claims 36 to 39 include the features of canceled claims 14 to 18 (claim 36 includes the features of claims 14 and 15). Dependent element claims 40 to 42 include the substrate features of claims 24 to 26.

Claims 43 to 45 are claims for a process for making the element of claim 35. Thus claim 43 also includes the feature of providing a substrate as defined in claim 22 as well as steps (C) and (D) from canceled element claim 19.

II. Anticipation Rejection

Claims 1 to 22 were rejected under 35 U.S.C. 102 (e) as anticipated by Davis, Jr., et al, US 6,576,380 B2 (referred to hereinbelow as US '380).

Claims 1 to 20 have been canceled, obviating their rejection on these grounds. Claims 21 and 22 remain pending and are not anticipated for the reasons described hereinbelow. New claims 23 to 45 have been added above and their features are summarized in section I.

A. Independent Claims

Independent substrate claims 21 and 22 are limited to a substrate with at least two layers or regions, a ceramic or glass ceramic base layer and a covering layer, which e.g. comprises silica and TiO_2 (according to claim 21 only). The independent process claims and the element claim are also limited to a substrate comprising a ceramic or glass ceramic base layer and a covering layer.

In contrast, US '380 teaches that the substrate is a Ti-doped high purity silica crystal-free glass wafer (claim 1) or a glass preform. Ceramic or glass ceramic material is not the same as a glass material. A ceramic or glass ceramic material is not the same as a glass material, because the ceramic or glass ceramic material includes a crystalline phase or regions. Furthermore its physical properties are correspondingly different because of the differences in structure. In other words, a ceramic or glass ceramic with a given chemical composition expressed by % by weight of various oxide ingredients is not the same material as a glass with the same oxide ingredients in the same % by weight.

US '380 describes a combustion process for making a Ti-doped glass covering layer, which produces a sort of inorganic soot and is described in column 7, line 55 and following of US '380. In this sort of soot-producing process, precursors of SiO_2 and TiO_2 are burned to form inorganic soot that precipitates in layers underneath the flames. This soot is then consolidated in a furnace at high temperatures to yield the glass preform.

US '380 clearly admits that defects and inclusions occur in the glass wafer preform made by the foregoing combustion method. US '380 teaches inspecting

the glass preform for defects and inclusions and selecting defect-free portions, which are then cut out of the body (column 8, line 65, to column 9, line 10). This inspection to find defect-free sections and subsequent drilling and cutting is not part of the applicants' process as claimed in claim 28. The applicants' process has the advantage that less defects and irregularities are formed in the substrate than in the glass perform of US '380.

According to US '380 the top surface of the glass perform is then polished as described in column 8, line 58 and following. After that, the reflective layer consisting of alternating Mo/Si or Mo/Be layers is directly applied to the top surface of the glass preform to make a reflective element for EUV microlithograph (column 7, lines 1 to 5). No intermediate covering layer is provided in the process for making the element described in US '380.

An absorbing layer 28 can also be provided over the reflective layer and other layers as described in column 7, lines 24 to 40, of US '380.

In fact, US '380 states that the substrate should not contain any ceramic or glass ceramic material in column 7, lines 45 to 50, only glass material. At this point, Davis, et al, state that the reflective multilayer coating should be applied directly on a glass wafer surface to avoid the complications of intermediate layers (like the covering layer of applications) used with glass ceramic crystalline substrates and provided by additional treatments. This constitutes teaching against the invention as claimed in claims 21 and 22 and claims 23 to 45.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the

claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

Davis, et al, clearly do not disclose the limitation that the substrate or preform should be made of **ceramic** or **glass ceramic** material. Davis, et al, in fact, exclude or teach against the use of glass ceramic or ceramic material for a wafer substrate for making masks used in EUV lithography processes. US '380 also precludes the use of a two-layer substrate of different materials.

However the glass ceramic base layer of the applicants has the great advantage that it can be produced by a casting process with greater homogeneity and internal quality than the glass preform of US '380. The green glass used to make the glass ceramic base layer can be easily cast in a controlled process that avoids including stria or striations. Also the ceramicization process is easily controlled so that good internal quality is not impaired.

On the other hand, the above-described combustion process for producing the inorganic soot and the glass preform of US '380 inevitably produces a layered structured and after consolidation in the furnace includes stria or striations, i.e. irregularities, inclusions and other defects. As a result, only certain regions of the glass preform can be used and a laborious inspection and cutting process is necessary to provide suitable glass preform pieces for further processing in the case of the method of US '380.

Thus the applicants' claimed processes, substrate and element are not only unobviously different from the corresponding processes, substrate and

element of US '380, they are of better quality.

Thus it is respectfully submitted that US '380 does not anticipate claims 21 to 26 and 30 to 34.

B. Dependent Claims

According to new dependent process claims 29 and 32, the covering layer is applied to the base layer by chemical vapor deposition, a sol-gel process or by sputtering with or without ion bombardment.

These features provide a covering layer that is of higher quality than can be produced by other prior art methods. Prior art "covering layers" comprising Ti-doped glass materials, such as those of US '380 as described above, have stria or striations because of the manner in which the "covering layer" (preform) is formed by the combustion method. As a result, their properties are not as uniform across the surface to which the reflective layer is applied. Applicants' substrate surface has less surface defects because of the presence of the covering layer and the processes for making it.

US '380 describe an entirely different combustion process for making a Ti-doped glass "covering layer" or preform, which is described in column 7, line 55 and following of US '380.

Thus it should be absolutely clear that dependent process claims 29 and 32 cannot be rejected as anticipated by US '380.

Claims 26, 31 and 42 claim a two-layer substrate in which the glass ceramic base layer has a thickness of at least 5 mm and the covering layer has a

thickness of 0.01 to 100 microns, so that the base layer determines the physical properties of the substrate. US '380 states that the substrate should be made of a single material; i.e. it should be the glass preform made by the combustion process. Thus it is a single layer of glass material, not a two layer substrate. US '380 does not disclose the basic two layer structure and thus does not anticipated claims 26, 31 and 42.

With respect to claim 23, column 1, lines 58 to 65, teach that expensive glass ceramics such as ZERODUR® should be avoided.

For the foregoing reasons withdrawal of the rejection of claims 21 to 22 under 35 U.S.C. 102 (e) as anticipated by Davis, Jr., et al, US 6,576,380 B2 is respectfully requested.

Similarly it is respectfully submitted that none of the new claims 23 to 45 should be rejected under 35 U.S.C. 102 (e) as anticipated by Davis, Jr., et al, US 6,576,380 B2.

III. Obviousness Based on US '380

It is respectfully submitted that none of claims 21 to 45 should be rejected under 35 U.S.C. 103 (a) as obvious over Davis, et al, US 6,576,380 B2.

A reference that contains teaching against a claimed invention should not be applied under 35 U.S.C. 103 (a) to reject the claimed invention. See M.P.E.P. 2145. X. Also the Federal Circuit Court of Appeals has said:

"In determining whether such a suggestion [of obviousness] can fairly be gleaned from the prior art, ...It is indeed pertinent that these references

teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." *In re Dow Chemical Co.*, 837 F.2d 469,473, 5 U.S.P.Q.2d 1529, 1532 (Fed.Cir. 1988).

US '380 states that the substrate for their mask should not contain ceramic or glass ceramic material in column 7, lines 45 to 50. At this point, Davis, et al, state that the reflective multilayer coating should be applied directly on a glass wafer surface without intermediate layers like applicants' covering layer. This constitutes teaching against the invention as claimed in claims 21 to 26 and 30 to 34.

With respect to new dependent process claims 29 and 32, US '380 teaches an entirely different method for forming the wafer surface based on controlled combustion to form a soot, which then becomes the glass wafer. The soot leads to a glass wafer with imperfections, such as defects and striations, and the glass perform must be worked mechanically and cut into regions, which do not have defects. The process of US '380 is not simply related to any of the processes claimed according to claims 29 and 32.

It is well established by many U. S. Court decisions that to reject a claimed invention under 35 U.S.C. 103 there must be some hint or suggestion in the prior art of the modifications of the disclosure in a prior art reference or references used to reject the claimed invention, which are necessary to arrive at the claimed invention. For example, the Court of Appeals for the Federal Circuit has said:

"Rather, to establish obviousness based on a combination of elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was

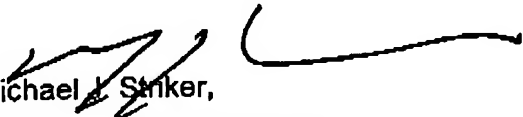
made by the applicant...Even when obviousness is based on as single reference there must be a showing of a suggestion of motivation to modify the teachings of that reference.." *In re Kotzab*, 55 U.S.P.Q. 2nd 1313 (Fed. Cir. 2000). See also M.P.E.P. 2141

For the foregoing reasons it is respectfully submitted that none of claims 21 to 45 should be rejected under 35 U.S.C. 103 (a) as obvious over Davis, Jr., et al, US 6,576,380 B2.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,


Michael J. Striker,
Attorney for the Applicants
Reg. No. 27,233